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Applications and Limitations of Suction Assisted Transverse Medial Thigh Lift

Umar Daraz Khan

Abstract

Aims and objectives: Skin laxity or excess can be a part of ageing process and weight loss. Skin laxity or excess is commonly experienced following weight loss around arms, thighs, face and neck, breast and abdomen. Various methods and techniques are described to address these excess skin issues. Liposuction assisted abdominoplasty has been described by Saldanha along with Colour Doppler studies of the superior and inferior epigastric arteries. Similarly DJ Hurwitz has described liposuction assisted brachioplasty. The process allows honeycombing of the subcutaneous tissue when suction lipectomy is performed using blunt tipped cannulas. Process allows creation of a safe plane superior to the deep fascial layer with preservation of the important nerves and vessels. Skin excess is removed without the need of sharp dissection or risks to the underlying structures. Postoperative bleeding and bruising is minimal and most of the instances the procedure is performed as a day case without drains. Patient postoperative analgesia requirements are minimal and allows patient to ambulate early with a quick recovery. **Methods:** Between 2009 and 2018, 153 suction assisted procedure were performed on various parts of the body. Of the 153 procedures 22 patients had thigh lifts as an outpatient. **Results:** There was no skin loss, DVT, PE or motor nerve damage. All patients retained sensation of the distal limbs.

Keywords: medial thigh lift, superficial fascial suspensory system, body contouring following massive weight loss

1. Introduction

With the change of lifestyle, easy availability of fast food and takeaways of rich food, acquired obesity is seen in all sections of life regardless of an individual socioeconomic background. For these reasons, obesity has been steadily on the rise along with its associated comorbidities causing an increased burden on health care delivery systems. However a rise in awareness related to the risks associated with obesity and introduction of safe procedures for bariatric surgery has resulted in an increased number of people with massive weight loss. Unfortunately, one of the undesirable side effects following massive weight loss is the redundant skin excess. Skin laxity or excess can also be, hereditary, hormonal, drug induced, part of ageing process, weight loss following conservative measures, drastic weight fluctuations

or following childbirths etc. Common sites of skin laxity or excess following weight loss are seen around arms, thighs, buttocks, face, neck, breast and abdomen. These areas of skin laxity or excess can be extremely distressing, unmanageable hygienically and often affect social, personal aspects of life. Weight loss following bariatric surgery or by any other means is only half the job done and the objectives are not fully achieved until skin laxity issues related to weight loss are dealt with using appropriate surgical procedures. The real goals of body weight loss are not complete until self-esteem, self-confidence and body image is not restored using surgical methods. Various techniques have been described time to time and to address the excess skin or skin laxity issues following significant weight loss, which in some individual, affect nearly their entire body.

To devise a procedure, mastery of the underlying anatomy and the role of these anatomical structures is paramount. The understanding, presence and introduction of the superficial fascial system by Lockwood in 1990 added anatomical sense to the procedures and longevity of the results [1]. However, reproducibility of a result is not without adding simplicity and safety to the procedure. Great advancements to body contouring surgeries following massive weight loss came after the introduction of liposuction without undermining prior to skin excision. Liposuction assisted abdominoplasty has been described by Saldanha which has added safety, simplicity and reproducibility to the procedure [2]. The procedure is widely used and reported by many other surgeons [3, 4]. Hurwitz has described liposuction assisted brachioplasty with a similar concept that has added simplicity, safety and reproducibility to the procedure [5]. Similarly, liposuction assisted medial thigh lift using transverse incision with or without vertical excision of medial thigh skin has added safety to the procedure and has also been reported with acceptable results and fewer complications [6–8]. Addition of liposuction prior to skin excision allows honeycombing of the subcutaneous tissue following the use of blunt tipped cannulas for lipectomy. Process allows creation of a safe plane superior to the deep fascial layer with preservation of the important nerves and vessels. Skin excess is removed without the need of undermining or dissection of adjacent skin. Postoperative bleeding and bruising are minimal and in most of the instances, the procedure is performed as a day case without drains. Postoperative analgesia requirements are minimal and allows patient to ambulate early with a quick recovery. When transverse resection is done without excision of vertical segment of skin, improvement is only limited to upper 3rd of the inside. Transverse resection alone may give very well concealed scars but is not suitable for massive weight loss patients where skin resection in vertical axis is mandatory for adequate results.

2. Material and methods

A retrospective chart review of 153 consecutive suction-assisted procedure was performed on various parts of the body. Of the 153 procedures 22 patients had suction assisted transverse medial thigh lifts as an outpatient procedure.

2.1 Inclusion and exclusion criteria

All patients in the series belonged to ASA class 1 or 2 with skin excess predominantly limited to upper medial compartment of thigh. Contraindications to this procedure include, lymphodema, smoking, diabetes or patients with history of vasculopathies. Those with a history of deep venous thrombosis (DVT) or other venous abnormalities of lower limb should be investigated and appropriate prophylaxis given.

Those patients who strongly expect or request circumferential results in upper, middle and lower thigh were excluded and not considered suitable for medial thigh lift.

3. Marking

All patients are marked in standing position. Two points are marked to delineate the limits of incision line incorporating the extent of medial thigh excision. Anterior limit and extent of the line is marked usually on the mid-inguinal point while posterior extent line is limited by the medial limit of the gluteal crease. Anteriorly, the extent of incision can be extended up and laterally to the anterior superior iliac spine if needed. From the anterior point, a line is drawn down and medially and 1–2 cm caudal and parallel to the inguinal ligament, groin and perineal fold. The line is extended posteriorly into the medial part of gluteal crease. It is extremely important in the medial groin and perineal area to draw the line 2 cm caudal to crease to prevent labial distortion. Proposed inferior incision line is drawn as a crescent, width of the crescent at its middle does not generally exceed 10–12 cm. Once the lower limit of the line is drawn, proposed excision lines are pinched together to ensure tension free closure and are checked with thighs in adduction, external rotation and gentle abduction for a tension free closure.

4. Anaesthesia, positioning, infiltration and technique

All procedures are performed under full general anaesthesia. All patients have endotracheal intubation for a secured airway. All patients receive intravenous antibiotics and intermittent pneumatic decompression device for DVT prophylaxis. Catheterisation of patients is not required due to short nature of the procedure unless the procedure is carried out simultaneously with another procedure. Low molecular weight heparin is given in selected cases of medial thigh lift unless the procedure is combined with other procedures. For a better intraoperative position and patient handling, procedure is performed in two separate positions. This allows access to the upper medial thigh without abducting or spreading the legs and I prefer to operate first in a prone position. Steps involve infiltration, liposuction and excision of the posterior half of crescentic markings before turning them to supine position to complete the surgery. Infiltration fluid is prepared using 1,000 cc of normal saline, 30 ml of 1% lidocaine plain and 1 mg of adrenaline (1:1,000). Measured and equal infiltration is performed using Luer Lock 50 cc syringes with 2 mm blunt tipped infiltration needles. On average 250 to 300 cc fluid is used on each side. Suction assisted lipectomy (SAL) is performed first using 4 mm suction cannula with patient in prone position. Aggressive liposuction is predominantly limited to the marked area to ensure viability of adjacent skin (**Figure 1a**). A conservative liposuction is also performed to an adjacent area on the thigh just below the proposed line of excision. This allows flexibility, thinning and, honeycombing of the skin flap. Honeycombing allows a better mobilisation of skin flaps and harmony in tissue thickness when approximated. Usually the skin flaps thickness up to 1.5–2 cm is ideal to keep lymphatic system secured. The liposuction plane is superficial to deep fascia that prevents injury to all important neurovascular bundles tucked well under the deep fascial layer. Starting from the lateral to medial from gluteal crease, skin is incised along the upper marked margin and up to midpoint of the marked crescent. The honeycombing allows risk free dissection of skin and defatted subcutaneous layer in downward direction and under direct vision. An inferiorly based flap is raised and once the dissection has reached to the lower

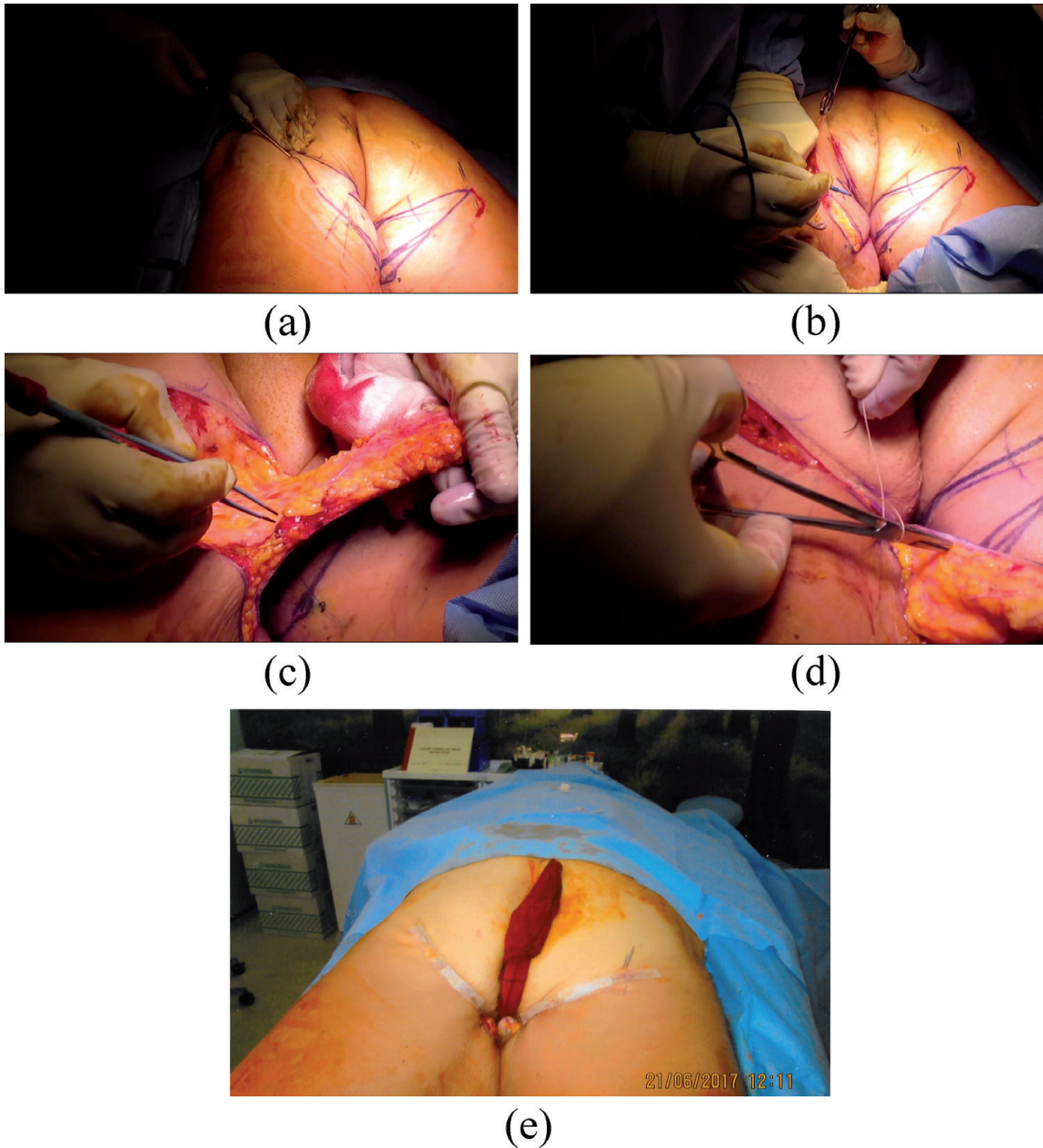


Figure 1.
Intraoperative pictures showing resection of the posterior half of the skin of left medial thigh, in prone position. (a) Liposuction of the posterior thigh. (b) Incision of the upper and lower margins of the posterior crescentic markings. (c) Lateral to medial dissection of the flap above deep fascia using finger-switch point diathermy on cutting mode. (d) Deep closure along with restoration of superficial suspensory ligament. (e) Posterior half of the medial thigh skin closure completed on both sides with an inch wide adhesive dressing.

margin of the marked crescent, proposed excision margin is approximated for a tension free closure. Adjustments are made if necessary. Skin is now incised along the lower margin and extended medially to the midpoint of the crescent (**Figure 1b**). The dissection and the separation of skin is performed using finger-switch point diathermy, closer to the skin flap and under direct vision which facilitates prospective haemostasis in a more secured way without disruption of lymphatic network (**Figure 1c**). Once excision of the posterior half of skin crescent is completed, superficial fascial system is restored using 2–0 vicryl sutures from dermis of the upper and lower skin margins and sutured to Colle’s fascia [9], fascia over the adductor muscle and periosteum of the pubic bone (**Figure 1d**). Skin closure is performed using 3–0 vicryl subcutaneous and 4–0 monocryl intradermal sutures and self-adhesive dressing (**Figure 1e**). Wound is dressed and patient is turned into supine position and the procedure is repeated on the anterior aspect to complete the medial

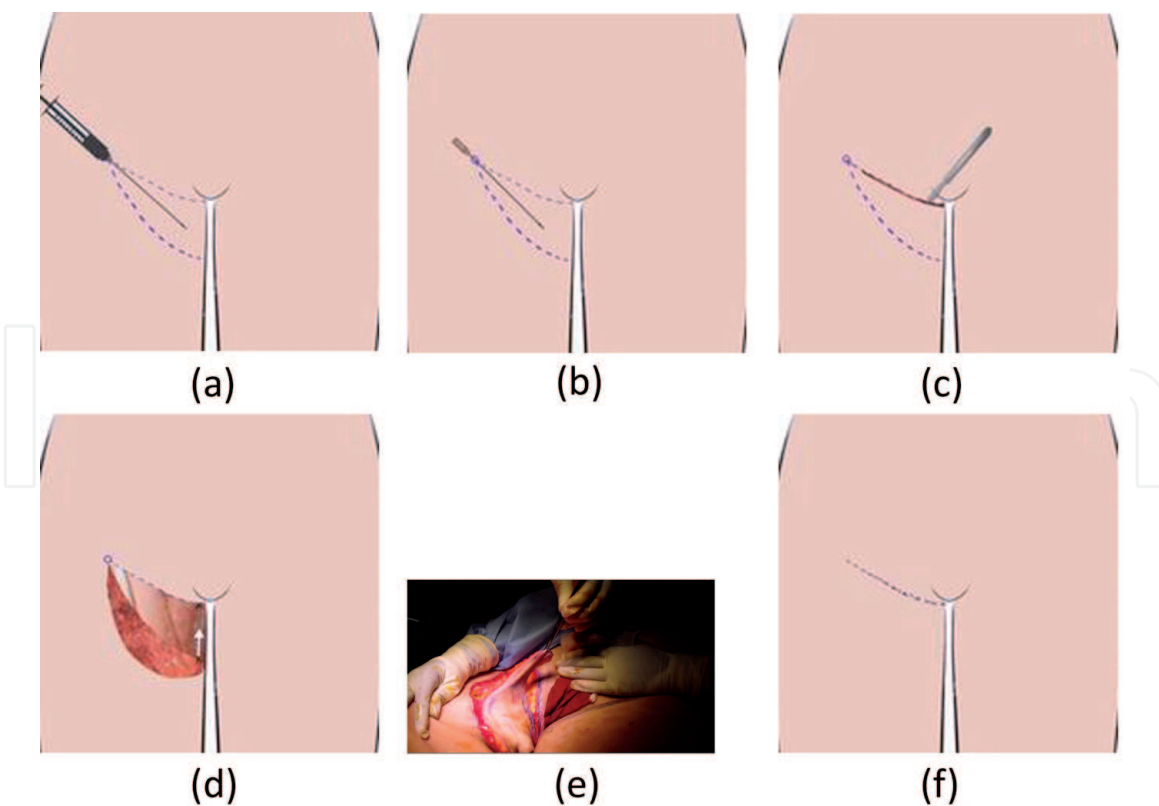


Figure 2.

Stages of anterior part of the suction assisted liposuction and medial thigh lift on the anterior aspect of right side. (a) Measured infiltration of fluid using 50cc Luer lock Syringe mounted with 2 mm infiltration blunt needle. (b) Suction assisted lipectomy using 4 mm cannula. (c) Skin incision in perineal thigh junction. (d) Inferiorly based flap with underlying muscle neurovascular bundle protected by deep fascia. Flap is pulled up to check and ensure a tension free closure before the skin belt is excised. (e) Lateral to medial skin flap dissection on the anterior aspect of right upper medial thigh. (f) Skin closure in layers.

thigh lift (**Figure 2a–f**). Dissection in the anterior part has to be done carefully to avoid injury to great saphenous vein and lymphatic system. Skin and fascial system closure is achieved as above. A single drain is used on each side and subsequently removed next day. Sutured area is wiped with Povidone Iodine, sprayed with an adhesive aerosol and an inch wide adhesive linear paper dressing applied. Light absorbent gauze dressing is placed and a surgical pressure garment applied.

4.1 Postoperative instructions

Patients stay in the clinic for at least 6–8 hours. Early postoperative ambulation is encouraged and elasticated compression stockings are applied until patient is well mobilised. Once they have passed urine, pain free and able to eat and drink without nausea or vomiting, they are allowed home with a supply of oral antibiotics and oral analgesia. Soft dressings can be taken down after two or three days and patients are encouraged to have sitz bath for localised cleansing and hygiene.

5. Results

All patients were females in the series and mostly done as day cases (**Figures 3–7**). There was no skin loss, wound breakdown, labial distortion, deep venous thrombosis, seroma, pulmonary embolism or motor nerve damage. Postoperatively all patients retained sensation of the distal limbs and there was no lymphedema noticed in any of the patient in the group.

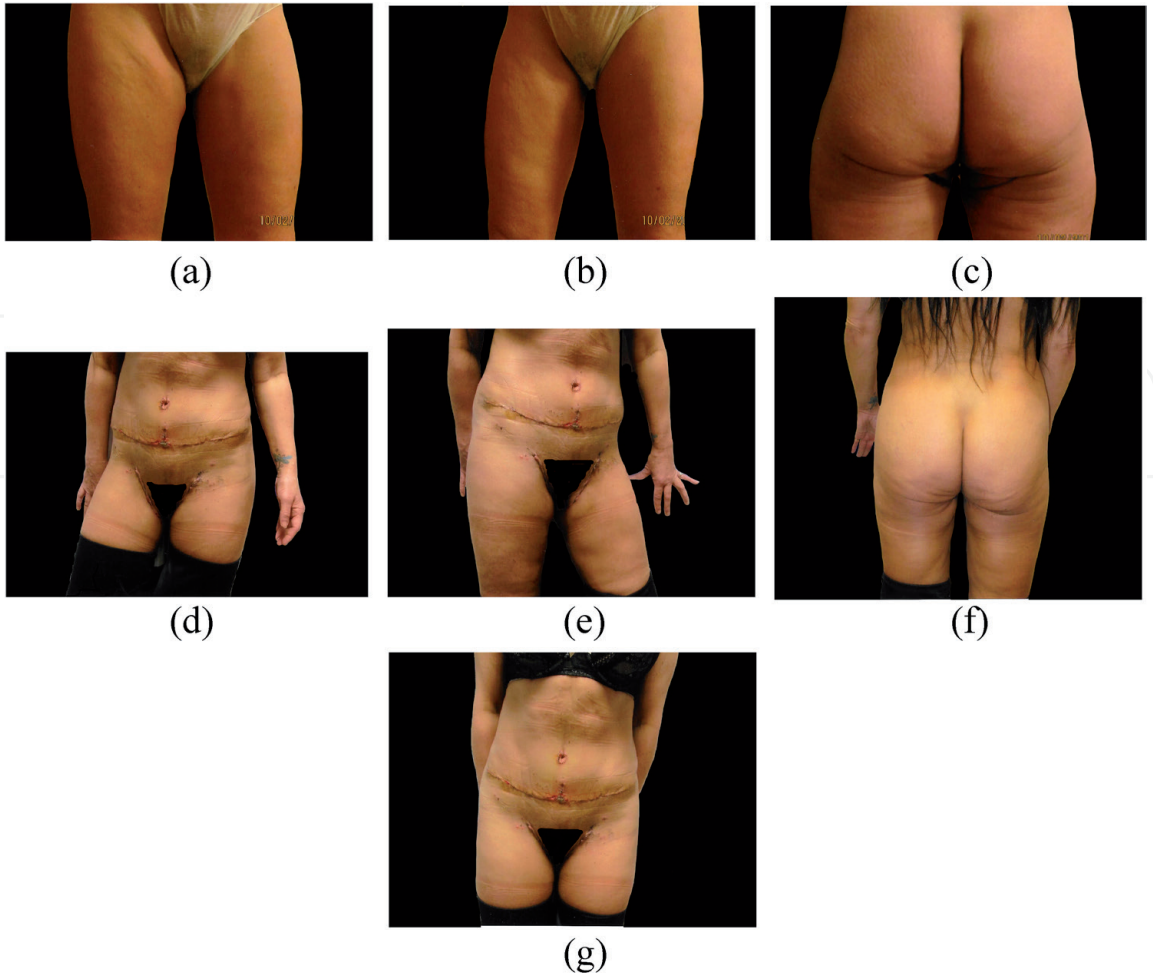


Figure 3.
(a–c) Preoperative views of a 38 year female model with minor skin excess of upper medial thigh (Pittsburgh Rating Scale 1). (d–g) Postoperative views two weeks following abdominoplasty and suction assisted medial thigh lift.

6. Discussion

Massive weight loss, either achieved using conservative measures or following bariatric surgery, is not without its noticeable side effects (**Figure 6a–f**). These patients are left with deflated chest/breast accompanied with redundant, loose and excess skin on face, neck, arms, abdomen, back, knees, upper and lower thighs and often circumferentially. On the other hand, the skin excess on the upper medial thigh can also be associated with generalised ageing process, weight fluctuations or changes seen following pregnancies (**Figures 3 and 4**) or moderate weight loss following conservative measures (**Figure 5a and b**). The skin excess or skin fold in upper medial thigh area may also result from overzealous liposuction or liposuction in poorly selected patients (**Figure 7a and b**). These iatrogenic deformities also benefit from medial thigh lift for skin excision.

A classification system for the deformities associated with massive weight loss for each area has been devised to grade the scale of these deformities. The system known as Pittsburgh Rating Scale (PRS) divides all these presentations from 0 to 3, zero being normal and 3 being most severe. The grading scale also suggests best operative approach for each grade [10].

The idea and need for rejuvenation of upper medial thigh is not new and with the safety of anaesthesia and postoperative management, techniques have been described in the past [11–13]. However the techniques described were unable to gain popularity among patients and surgeons alike. Inferior scar migration, scar

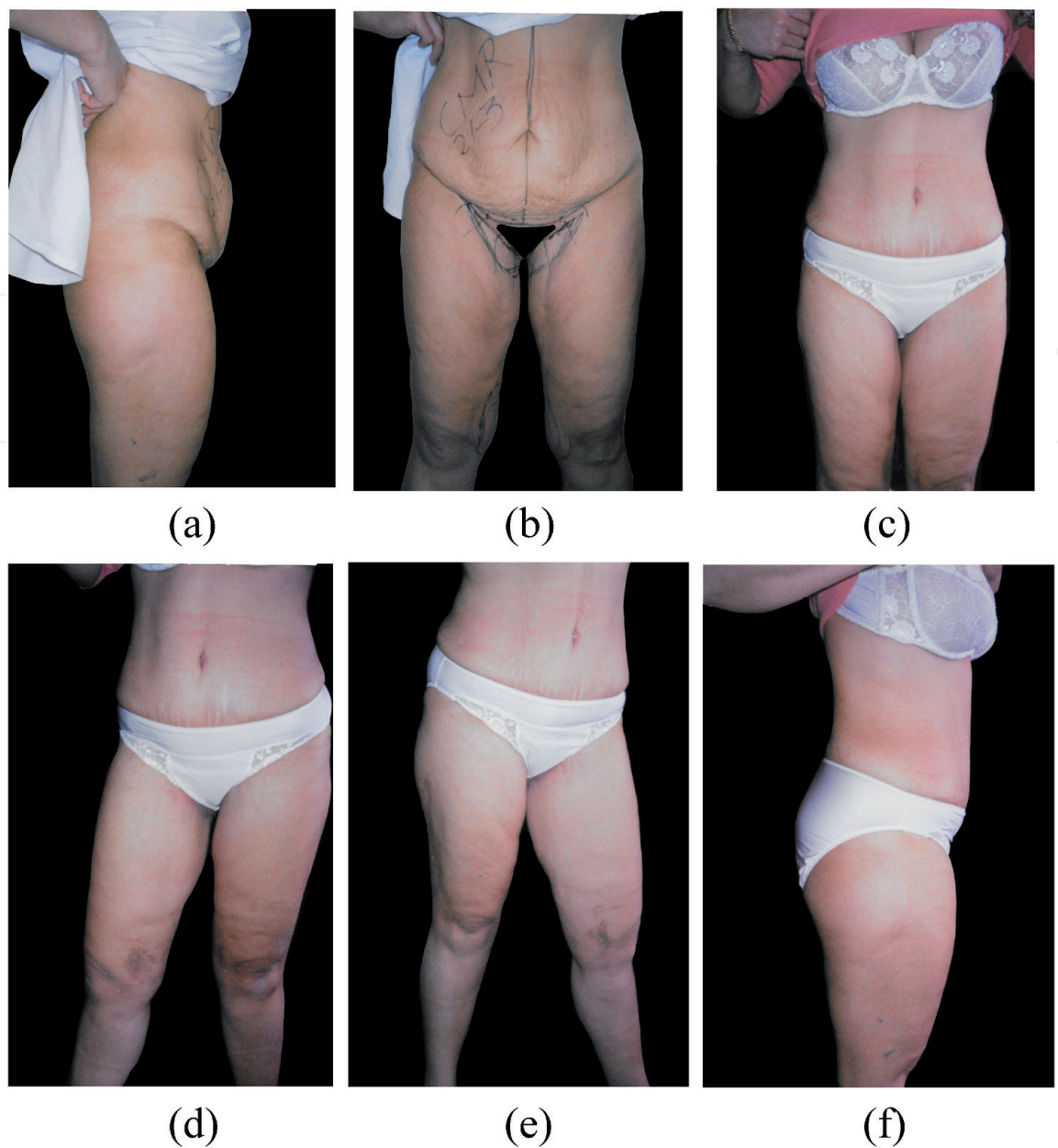


Figure 4.
(a and b). A 45 year old lady who presented with moderate skin laxity on anterior abdominal wall and upper medial thigh (Pittsburgh Rating Scale 2) following pregnancy and age related changes. (c-f) Postoperative views showing results following suction assisted lipo-abdominoplasty and medial thigh lift.

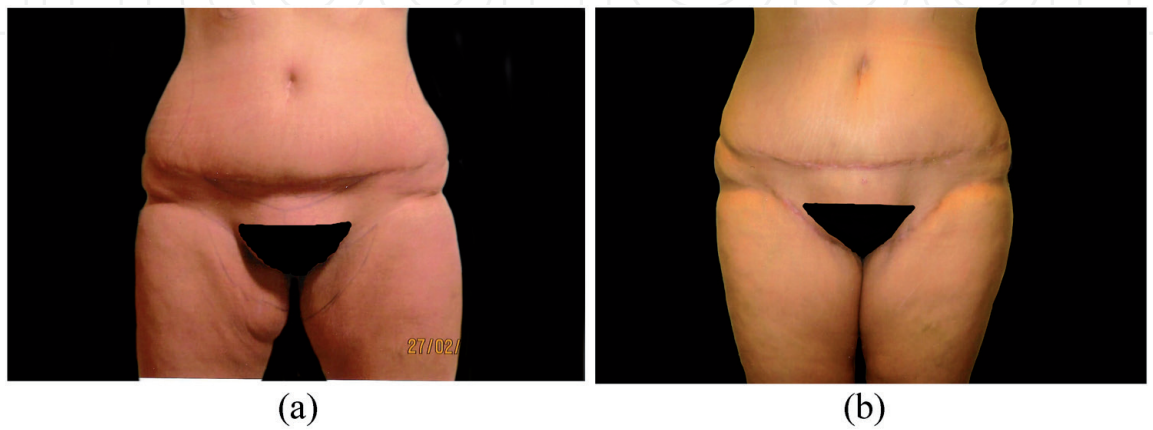


Figure 5.
(a) A 35-year-old female presenting with major upper medial thigh skin excess following considerable weight loss (Pittsburgh Rating Scale 2). She also was not happy from inadequate results following her abdominoplasty elsewhere. (b) Post-operative view following suction assisted medial thigh lift and revision of abdominoplasty and liposuction of flanks.

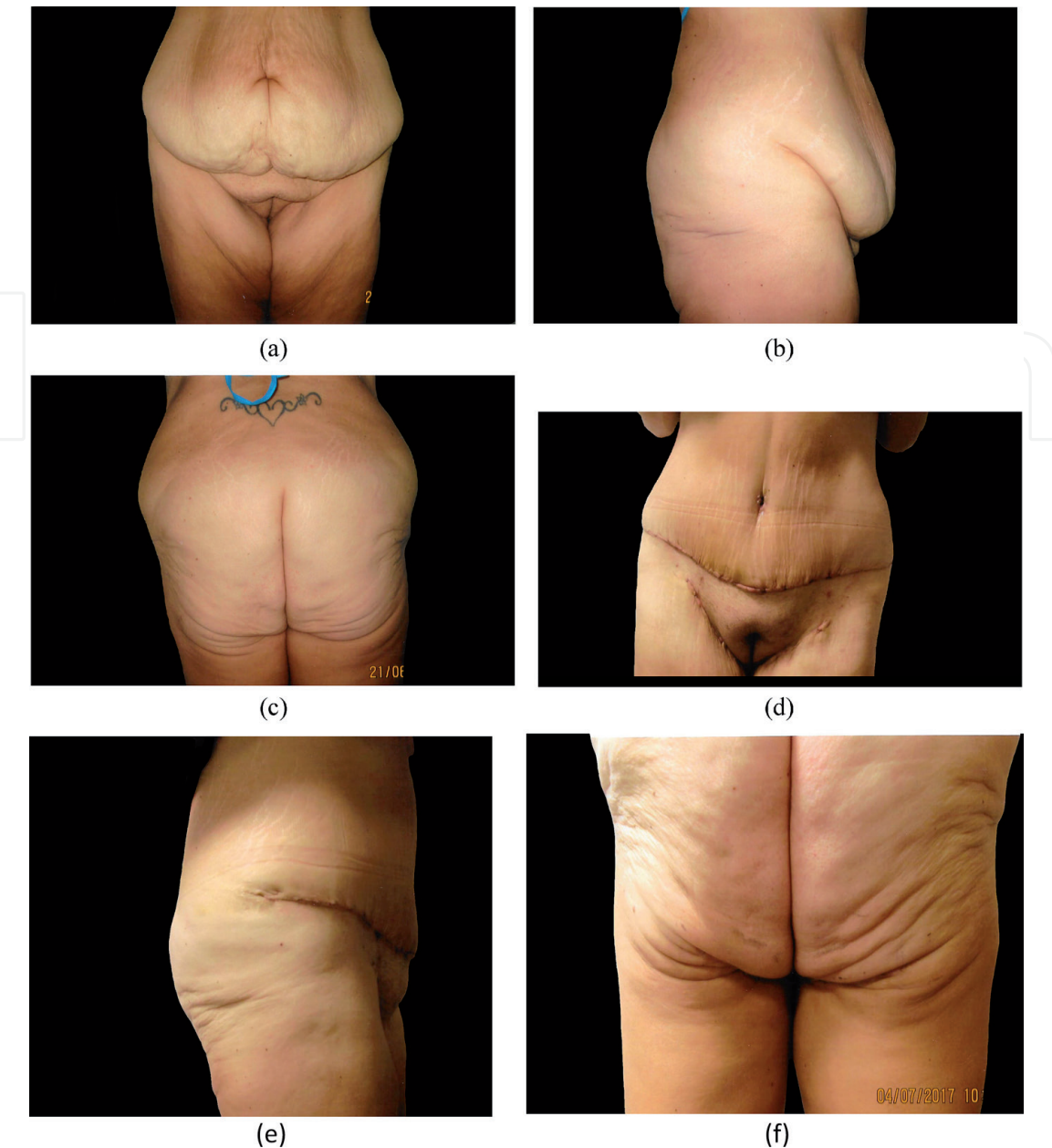


Figure 6. (a–c) Preoperative views of a lady following massive weight loss. She was unhappy with the abdominal skin excess and contouring along with skin laxity on upper medial thigh (Pittsburgh Rating Scale 3). (d and e) Postoperative views showing results following suction assisted lipo-abdominoplasty and medial thigh lift as a day case. The improvement was limited to upper medial third only (f).

stretching, labial distortion or widening exposing labia-minora and recurrence of ptosis were to name the few. The precise anatomical description and introduction of superficial fascial system suspension by Lockwood provided a new impetus and vigour to perform these surgeries. The renewed knowledge and detailed anatomy of the superficial fascial system helps to restore trunk and limb anatomy resulting in its rejuvenation following massive weight. Lockwood technique of restoring this system has given remarkably improved and longer lasting results with elimination of the drawbacks attached with thigh lifts procedures described earlier [1, 14, 15].

Recent colour Doppler studies following liposuction to the abdominal wall has changed the concepts, horizon, and application of the procedure to various body contouring procedures including medial thigh lift. Doppler Flowmetry studies, performed by Dr. Graf, showed that there was no damage to the abdominal skin perforator system arising from the deep epigastric system and on the contrary, there was an increase of

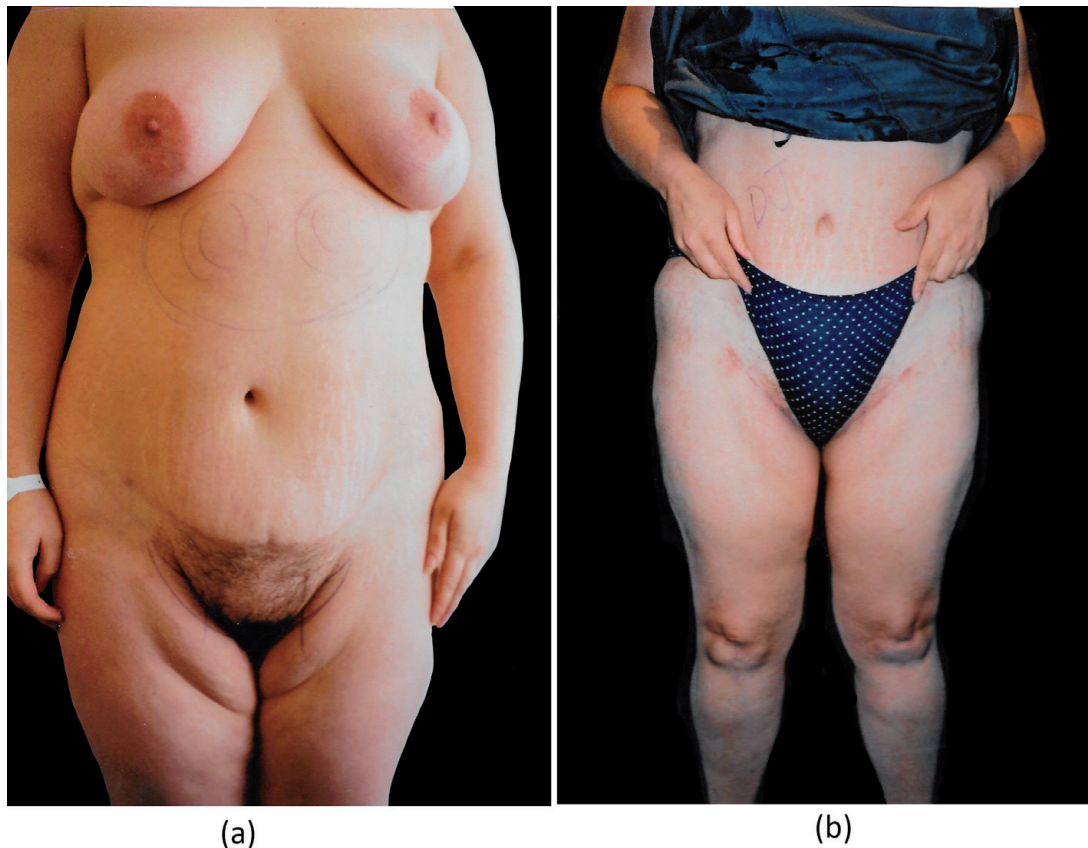


Figure 7.
 (a) A 29-year young lady who presented with medial thigh skin excess and laxity following aggressive suction assisted liposuction. (b) Three months following suction assisted medial thigh lift as a day case.

56% blood flow through these perforators [16]. The report of the results have changed previously held concepts of abdominal blood supply that discouraged anterior abdominal wall liposuction combined with abdominoplasty [17, 18]. Honeycombing of the subcutaneous layer of fat resulting from suction assisted liposuction allows anterior abdominal wall to get pulled down without the need of extensive undermining of abdominal wall skin or dissection and preserving anterior wall vascularity at the same time [2, 4, 16]. The concept was extended to liposuction assisted brachioplasty and medial thigh lift with safety, reproducibility and acceptable results [5–8].

Suction assisted medial thigh lift can be performed using a transverse incision with or without vertical element. The procedure can also be performed on its own, or it can be combined with other procedures. When performed on its own, it can be performed as a single stage day case procedure. Some surgeon still prefers to do the liposuction first and skin resection as a second stage procedure, about six months or so later. By staging the procedure, the idea is to add safety to the skin flap, as it is generally believed that liposuction combined with medial thigh lift may result in higher local complication rate including skin flap necrosis. However, staging the procedure needs two hospitalisations each at an extra cost, with two sets of recovery periods and each procedure may have its own complications. Additionally, liposuction does result in subcutaneous scarring and quite often makes the tissue dissection and resection difficult, which may increase the incidence of local complication rate on its own [6]. On the contrary, complications rates following liposuction assisted medial thigh lifts are few and gives an added benefit of performing it as a day case. Vascularity of the skin flaps, due to undisturbed perforators, prevents skin necrosis or wound dehiscence secondary to ischemia. Honeycombing of the underlying tissue allows skin approximation without creating a dead space or putting any pressure

on the skin edges resulting in good healing. Absence of dead space complemented by intact venous and lymphatic system prevent seroma formation and surgery can be performed without drains [6, 8]. Liposuction assisted transverse medial thigh lift have shown no skin flap necrosis, wound dehiscence or other major complications when compared with en bloc excision [8].

In personal experience of the author, all patients have shown a good and early recovery with no wound breakdown or skin flap necrosis. However and for adequate results, patient selection is extremely important. The transverse resection procedure should ideally be limited to PRS Scale 1–2 [10]. Drawback or disadvantage of suction assisted transverse medial thigh lift is the extent of improvement expected. This improvement is normally limited to upper medial third mostly (**Figure 6a–f**). When a patient presents with massive weight loss (PRS Scale 3), a vertical component must be added to transverse resection for an adequate circumferential results unless patient is not prepared to have an extensive scars on the inside of the thigh. Patient must be informed that, when transverse skin excision is performed, improvements are limited to upper third of the inside of the thigh only and no change is expected to lower two thirds of the inner aspect of the thigh or to other parts of the thigh including buttock area (**Figure 6a–f**). Last but not least, a proper history and physical examination, thorough informed consent and appropriate selection of patient is mandatory for a beneficial outcome and is the key to a happy patient.

7. Conclusion

Restoration of superficial fascial system suspension combined with suction assisted lipectomy for transverse medial thigh lift is safe, swift and minimises surgical morbidity and associated with quicker recovery. Neurovascular bundles are preserved, as the plane of dissection created is superficial to deep fascia with neurovascular bundles safely encased underneath. When performed alone, improvement and rejuvenation is limited to upper medial third of the thigh alone.

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Conflict of interest

The author declares that they have no conflict of interests.

Informed consent

Informed consent was obtained from all individuals participants included in the study.

Ethical standards

All procedures performed in the studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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